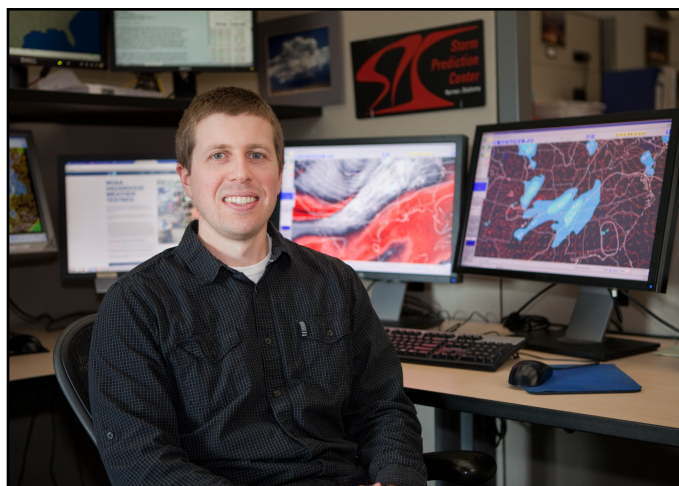


THE CONVECTIVE WATCHER



SPC Departures, Arrivals and Promotions

Operations Staff Departures



Jaret Rogers, former SPC Mesoscale Assistant/Fire Weather forecaster, is now a Lead Forecaster at NWS Phoenix.

The SPC wishes farewell to Jaret Rogers, who departed the SPC to become a Lead Forecaster at the National Weather Service Forecast Office in Phoenix, Arizona. At the SPC, Jaret served as a Mesoscale Assistant/Fire Weather Forecaster from 2010 through 2016. Previously, Jaret was a Meteorologist Intern at the NWS Phoenix office before his tenure at SPC. Jaret's contributions to enhancing SPC products and services, along with operational meteorology, are numerous. He is known for his developmental work on the SPC Sounding Climatology (<http://www.spc.noaa.gov/exper/soundingclimo/>), which contextualizes data from individual observed atmospheric soundings within the broader period of record. Jaret also served

as fire-weather focal point, a position in which he led efforts to enhance the SPC fire-weather program and to build relationships with fire-weather agencies. Furthermore, Jaret was responsible for leading the SPC Career Experience Program, which offers University of Oklahoma meteorology students an opportunity to perform research under the supervision of SPC meteorologists. He also was a key contributor to collaborative research regarding

thunderstorms and severe weather affecting central and southern Arizona associated with the North American monsoon. Jaret has undoubtedly provided meaningful contributions to the Storm Prediction Center and the field of operational meteorology, and the SPC wishes him all the best in his new position in the NWS.



Dr. Ariel Cohen, the new Science and Operations Officer at National Weather Service Topeka, KS, broadcasts live on NOAA Weather Radio.

Dr. Ariel Cohen, former SPC Mesoscale Assistant/Fire Weather Forecaster, became the Science Operations Officer (SOO) at the National Weather Service Forecast Office in Topeka, KS in September 2017. Arriving at SPC in the spring of 2011, Ariel concurrently worked toward and completed his Ph.D. in Meteorology from the University of Oklahoma. While at SPC, Ariel's contributions were many. Ariel published several research papers in the American Meteorological Society journals. This body of research, along with research collaborations with other SPC and NWS forecasters has helped to advance forecast operations over the years. As a natural teacher and collaborator, Ariel helped to create and teach the Applications of Meteorological Theory to Severe-

Thunderstorm Forecasting course for the University of Oklahoma School of Meteorology. Ariel enjoyed serving as a mentor for many student's research projects through the OU/SPC Career Experience program as well as the REU (Research Experience for Undergraduates) and NOAA Hollings Scholar programs. Additionally, Ariel regularly contributed to the SPC newsletter and social media platforms. Finally, Ariel provided stellar severe convective and fire weather forecasts. Prior to his time at SPC, Ariel worked at the National Weather Service Forecast Offices in Great Falls, MT and Jackson, MS as well as at the National Hurricane Center in Miami, FL. Ariel's top-notch work ethic and enthusiastic attitude will be missed at SPC and we wish him good luck in his new position at NWS Topeka!

Operations Staff Promotions

Matt Mosier, former SPC Mesoscale Assistant/Fire Weather Forecaster, was promoted to the SPC Mesoscale/Outlook Forecaster position in September 2017. Says Matt of his time at SPC, "I'm honored to be able to continue working at the Storm Prediction Center. I have enjoyed my past 5 years here and am looking forward to many more years forecasting severe weather and researching topics such as violent tornadoes, lightning, and model verification." Matt arrived at SPC in the winter of 2012 from the National Weather Service Forecast Office in Fort Worth, TX.

Joey Picca, former SPC Mesoscale Assistant/Fire Weather Forecaster, was promoted to the SPC Mesoscale/Outlook Forecaster position in September 2017. Joey says, "Having



Matt Mosier (left) and Joey Picca (right) were recently promoted to the position of Mesoscale/Outlook forecaster at SPC. Matt and Joey are responsible for composing mesoscale convective discussions and the Days 1-8 Convective Outlooks.

originally specialized in dual-polarization radar in graduate school, my work in the NWS has focused on the advancement and implementation of new radar algorithms and analysis techniques. Additionally, I've gained an appreciation for translating complex topics (such as radar analysis) via clean, effective visualizations, making these topics suitable for a wide range of audiences.” Joey arrived at SPC in the fall of 2014 from the National Weather Service Forecast Office in New York City, NY.

Science Support Branch

Dr. Chris Karstens joined the SPC Science Support Branch as a Techniques Development Meteorologist in August 2017. Before arriving at SPC, Chris was a Research Scientist at the



Dr. Chris Karstens (left) and Matt Elliot (right) joined the SPC Science Support Branch as Techniques Development Meteorologists in August 2017. Their main tasks are to aid in developing new guidance, tools and infusing research to operations into daily SPC forecasting processes. Additionally, Chris and Matt have been trained to fill in at the Mesoscale Assistant and Fire Weather forecaster desks in SPC operations.

Cooperative Institute for Mesoscale Meteorological Studies/National Severe Storms Laboratory (CIMMS/NSSL) at the University of Oklahoma, conducting research and development for the Forecasting a Continuum of Environmental Threats (FACETs) project. Before that, Chris attended Iowa State University where he earned a B.S., M.S., and Ph.D. in Meteorology and a Graduate Certificate in GIS. His research interests are in probabilistic forecasting and verification of severe convective hazards, and the application of GIS to short-term high-impact severe convective hazards (real-time and post-event).

Matt Elliot joined the SPC Science Support Branch as a Techniques Development Meteorologist in August 2017. Prior to coming to the Storm Prediction Center, Matt spent nearly three years as a forecaster at the National Weather Service Weather Forecast Office in Sterling, VA. While there, he was responsible for issuing watches and warnings and forecasting daily weather conditions for nearly 10 million people within the forecast area. He worked several notable weather events including the record-breaking January 2016 blizzard, which crippled the Washington D.C. and Baltimore metro areas for almost a week. Matt's meteorological interests include severe weather and lightning, improving visualization of meteorological data, and enhancing techniques to improve weather forecasting. He also enjoys playing sports, photography, traveling, and spending time with his wife and family.

SPC Meteorologists Honored at the 42nd Annual National Weather Association Meeting in Garden Grove, California

Each year, SPC meteorologists attend scientific conferences to present research findings, give updates on operational practices, and learn about ongoing research in the field of meteorology. This year, several current and former SPC meteorologists were recognized for exceptional service at the 2017 Annual Meeting of the National Weather Association.

Special Lifetime Achievement Award

Steven J. Weiss
NOAA-NWS Storm Prediction Center

Steve was selected for the Special Lifetime Achievement Award for contributions to operational meteorology, specifically forecasts of severe convective storms, that includes science-centered leadership within forecast operations, mentorship of students and young scientists, and supreme dedication to the transition of scientific



Steve Weiss' career at SPC has spanned more than 40 years.

research to forecast operations, that have advanced our enterprise and helped protect society.

Steve began his career at the SPC in 1974. During this time, the SPC was located in Kansas City, MO and known as the National Severe Storms Forecast Center. Steve has served as a Lead Forecaster, Science and Operations Officer and is currently the Science and Support Branch Chief. Steve's leadership, contributions to the field of meteorology and strong work ethic have helped shape the SPC into the premier severe storms forecasting center that it is today.

Stephen Corfidi

NOAA-NWS Storm Prediction Center - retired

OU CIMMS (Cooperative Institute for Mesoscale Meteorological Studies) with WDTD (Warning Decision Training Division)

For his commitment to public service, unmatched record of operational meteorology research, advancement of convective forecasting through research, mentoring and leadership. Stephen retired from the SPC in the summer of 2016.

T. Theodore Fujita Research Achievement Award



Richard Thompson, SPC Lead Forecaster.

Richard Thompson

NOAA-NWS Storm Prediction Center

Rich was selected for the T. Theodore Fujita Research Achievement Award for over two decades of severe storms forecasting, prolific scientific publication, devoted mentorship, education, and development of operational forecasting techniques used worldwide.

Rich began his career at SPC in the 1990s as a Mesoscale/Outlook forecaster and currently holds the Lead Forecaster position. Many are likely familiar with the Significant Tornado and Supercell Composite Parameters used in severe weather forecasting. Rich was instrumental in conducting the research and verification related to these parameters in the early 2000s. More recently, Rich has worked on compiling climatologies of near-storm environments based on convective mode

and tornado-producing storms. From this work, innovative probabilistic guidance for tornado damage intensity has been derived. Rich's passion for research and improving forecast

operations is sure to keep the SPC on the cutting-edge of severe storms science for many years to come.

American Association of State Climatologists Recognize SPC Meteorologist's Research at 2017 Annual Meeting



Dr. Ashton Robinson Cook, SPC Mesoscale Assistant and Fire Weather forecaster, receives the 2017 Dissertation Award for Outstanding Climate Research.

Mesoscale Assistant and Fire Weather Forecaster Dr. Ashton Robinson Cook was recognized this year by the American Association of State Climatologists at their annual meeting Asheville, NC. Ashton was presented the 2017 Dissertation Award for Outstanding Climate Research. His dissertation, titled “The Impact of El Niño Southern Oscillation on U.S. Winter and Early Spring Tornado Outbreaks” takes an in-depth look into ENSO phase and potential implications for seasonal severe weather forecasting.

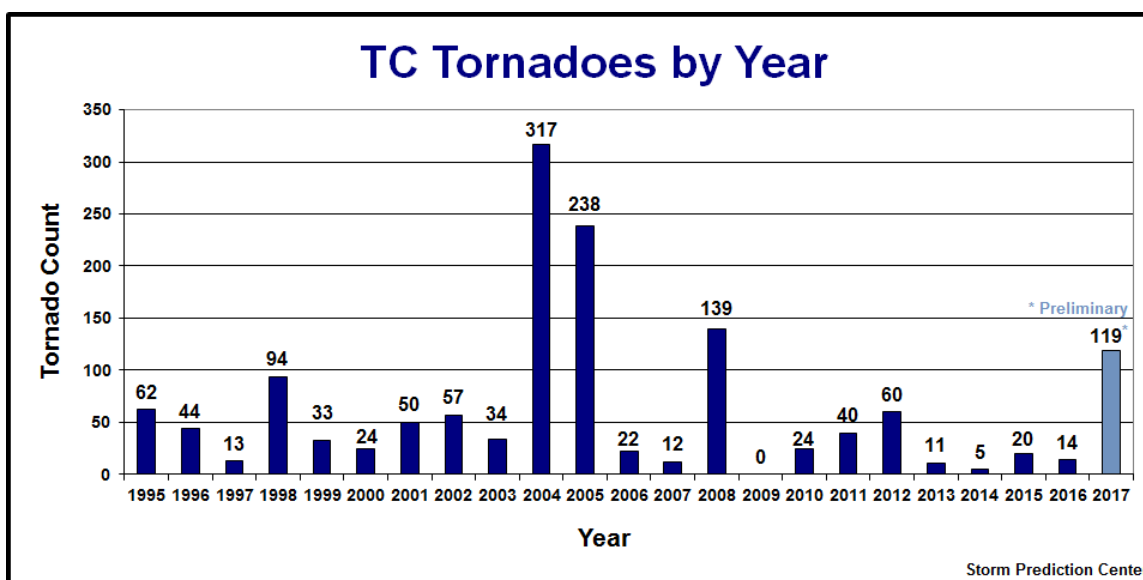
Atlantic Basin Experiences Active Tropical Cyclone Season, Most Tropical Cyclone Tornadoes Since 2008

By Roger Edwards, Lead Forecaster

The [Storm Prediction Center](#) forecasts the tornado threat from tropical cyclones (TCs) that affect the contiguous U.S. Our [outlooks](#), [mesoscale discussions](#) and [watches](#) for TC tornadoes begin with [National Hurricane Center](#) (NHC) predictions of cyclone track, size and intensity. Those factors influence the very same four favorable ingredients that we examine for tornado-producing supercells in other settings: moisture (usually not a question in TCs), lift, instability, and vertical wind shear.

Most TC tornadoes occur north through southeast of center, in the outer parts of the circulation. This sector of TCs usually contains the most favorable combination of the four key ingredients. Still, the tornado threat can vary a lot from system to system. Every TC has a different “personality” in terms of its structure and behavior, which can change over time from its landfall approach until it dissipates inland. The whole time, we must do careful surface and upper-air analysis of each TC to fine-tune the forecasts.

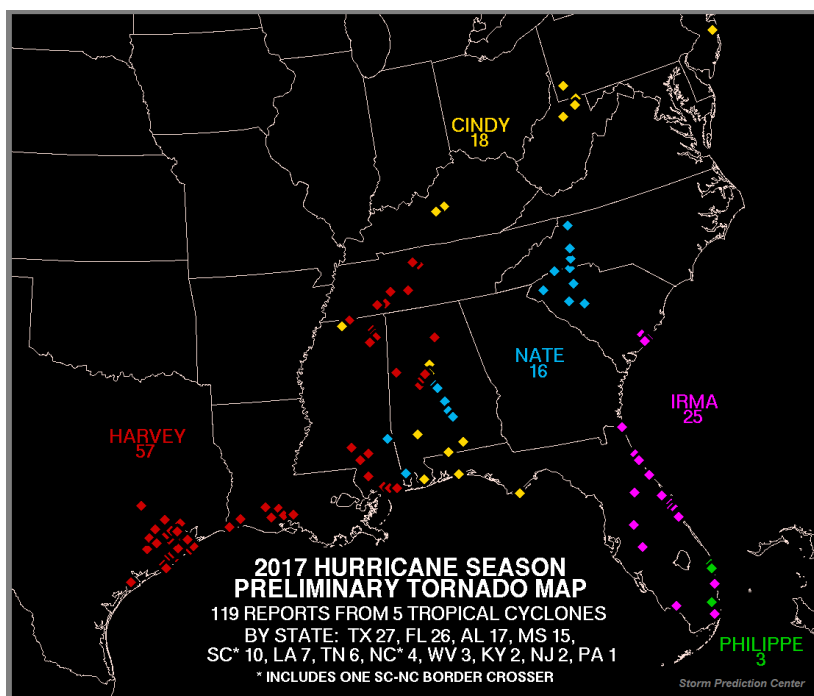
TCs can vary wildly in their tornado yield, from none to a record of 118 (Hurricane Ivan in 2004). Most have fewer than 25 tornadoes, typically small, brief and weak, with over 90% rated EF0 or EF1 on the [Enhanced Fujita scale](#). Still, strong tornadoes of EF2 or greater can occur in TCs, and any tornado can kill. Several TC tornadoes in earlier years have caused multiple deaths and injuries. For more on the science of TC tornadoes and how we predict them, see [this formal review article](#) on the SPC Publications website.



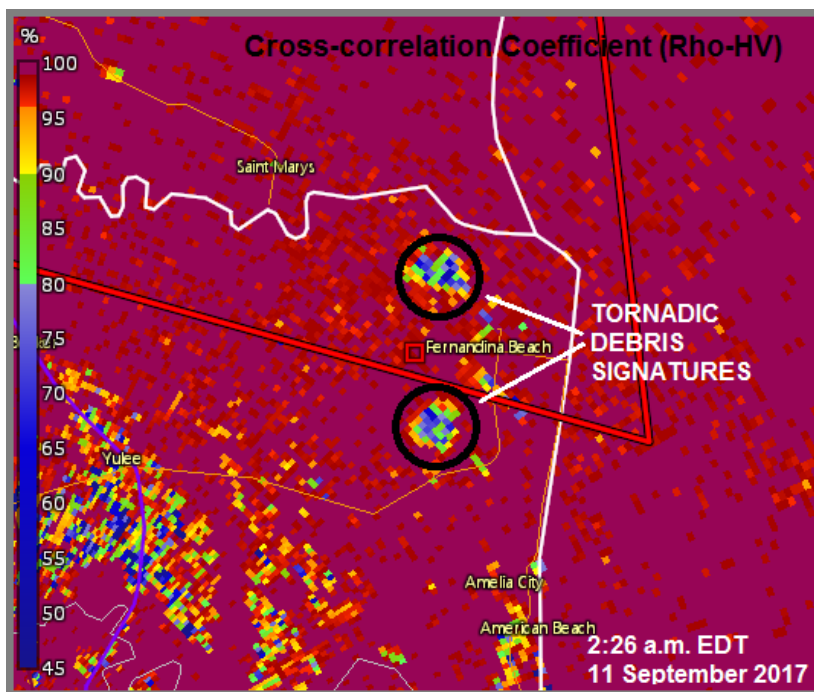
The 2017 hurricane season has been the most active in this decade for the U.S., and that includes tornadoes. The *preliminary* total count of 119 tornadoes probably will change somewhat, until data are finalized in spring 2018. Still, 2017 should rank as the most active for TC tornadoes since 2008. This was the fourth busiest in the modern era of Doppler radar (1995 onward), when TC tornado information is the most reliable.

Five systems—Cindy, Harvey, Irma, Nate, and Philippe—produced tornadoes this season. The *preliminary* map of this season’s TC tornadoes (image on next page) spans a vast area from Texas to the Mid-Atlantic region and Florida, based on a combination of post-storm reports and public information statements provided by local NWS forecast offices.

In mid to late June, Tropical Storm Cindy formed over the Gulf and moved inland near the mouth of the Sabine River. The remnant circulation slowly weakened on a long trek across the eastern U.S., then interacted with a cold front, spawning 18 tornadoes from the central Gulf Coast to the central Appalachians and even New Jersey.



Hurricane Harvey will be remembered most for its record rains and catastrophic, wide-area flooding in southeast Texas. Amidst that disaster, it also spawned 27 known tornadoes in Texas and 57 overall. The last TC with more total tornadoes was Rita in 2005, at 98. Although some of Harvey's tornadoes hit the Houston metro area, they caused no deaths and just EF0 to EF1 damage. The most substantial of Harvey's tornadoes yielded spectacular video and carved a 31-mile-long, 400-yard-wide path in and near Reform, AL, with six injuries and an EF2 rating ([NWS Birmingham site](http://www.birminghamherald.com/story/news/nation/2017/09/08/hurricane-harvey-tornado-reform-alabama/647117001/)).



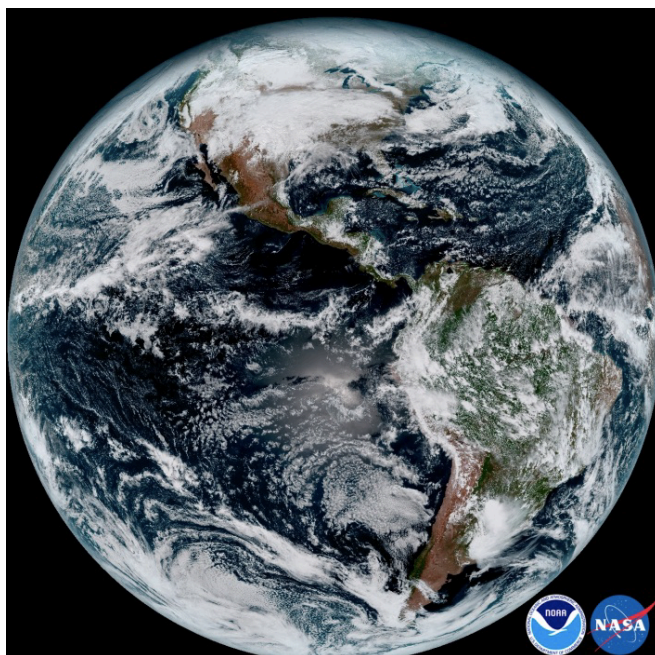
Irma in September was a massive and powerful "Cabo Verde" hurricane that devastated several northeastern Caribbean islands at category-5 intensity. By the time it reached Florida, Irma was less intense but still was a major hurricane, with numerous strongly rotating supercells detected by radar over the Atlantic Ocean. The number of tornadoes they had over water will never be known. Some of the supercells did survive cooler inland air long enough for 21 Florida tornadoes, most near the East Coast, then four more near Charleston, SC. One late-night supercell near Fernandina Beach, FL, already had two

tornadoes going at the same time as it moved ashore from the Atlantic. Both tornadoes' inland debris plumes showed up brightly on Doppler radar (image lower left). Though not counting in our records, Bahamian news agencies also reported tornado damage on Grand Bahama from Irma, and at least one tornado there was caught on video.

Fast-moving Hurricane Nate crossed the Mississippi River mouth and the Mississippi coast on the night of October 7–8. This landfall stage yielded six tornadoes in Mississippi and Alabama, all rated EF0 or EF1. By the next afternoon, a series of northward-moving supercells formed in a very moist, well-heated air mass over the western Carolinas. Ten tornadoes resulted, one crossing the state line. A 38-mile path in Laurens and Spartanburg Counties, SC, is the third longest on record for a TC tornado in the 1995–2017 era, with EF2 damage to one house. A separate EF2 tornado struck Norris, SC. The last tornado from Nate was the first tornado of any kind in Ashe County, NC, since records began in 1950.

Finally, despite being messy and disorganized, Tropical Storm Philippe produced three EF0 tornadoes over Miami-Dade and Palm Beach Counties, FL, on October 28.

New Generation of Weather Satellites Make Long-Awaited Debut

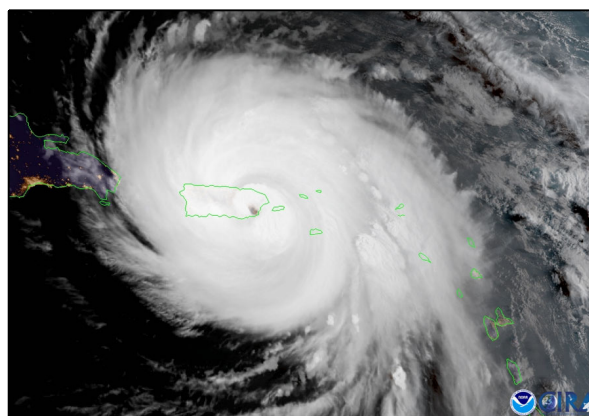


The first image from GOES-16 on January 15, 2017.

GOES-16, formerly known as GOES-R, was launched on Nov. 19, 2016 at 6:42pm EST from Cape Canaveral, Florida. The first images from the satellite were sent back to Earth on January 15, 2017.

This particular image (left) is a composite color full-disk visible image and was captured at 1:07pm EST on January 15, 2017. In the image, you can see the full Western Hemisphere, including North and South America, the eastern Pacific Ocean and the western Atlantic Ocean. GOES-16 observes Earth from an equatorial view approximately 22,300 miles high, creating full disk images like these from the coast of West Africa, to Guam, and everything in between.

Some exciting new features of the satellite include higher temporal resolution data. It can provide a full disk image of the Earth every 15 minutes, one of the continental U.S. every five minutes, and has the ability to target regional areas where severe weather, hurricanes, wildfires, volcanic eruptions or other high-impact environmental phenomena are occurring as often as every 30 seconds. The GOES-16 Imager covers the Earth five-times faster than the previous generation GOES imagers, and has



Hurricane Maria makes landfall in Puerto Rico, September 20, 2017.

four-times greater spatial resolution. The GOES-16 satellite began maneuvers in early December to move to its permanent orbit, replacing the aging GOES-13 satellite (GOES-EAST). Nominal operations resumed on December 18, 2017.

2017 saw many events which allowed the new instruments on GOES-16 to shine, including the busiest Atlantic Basin hurricane season in nearly a decade. For more information on the GOES family of satellites, including photos and video, visit the website <http://www.goes-r.gov>.

The next spacecraft in the series, GOES-S, successfully launched from Cape Canaveral, FL on March 1, 2018. Now dubbed GOES-17, testing and orbital maneuvers will occur over the next several months. Once the satellite arrives at its final orbit, it will replace the aging GOES-15 satellite and officially become GOES-West.

New HREF Data Available on SPC Forecast Tools Web Page

In November 2017, the new HREF (High-Resolution Ensemble Forecast) system replaced the SSEO (Storm-Scale Ensemble of Opportunity) system. A new and improved web interface to view the HREF was designed by SPC/NSSL CIMMS contractor Dr. Brett Roberts. HREF data is available under the “Forecast Tools” tab on the SPC website, or by following this link: <http://www.spc.noaa.gov/exper/href/>.

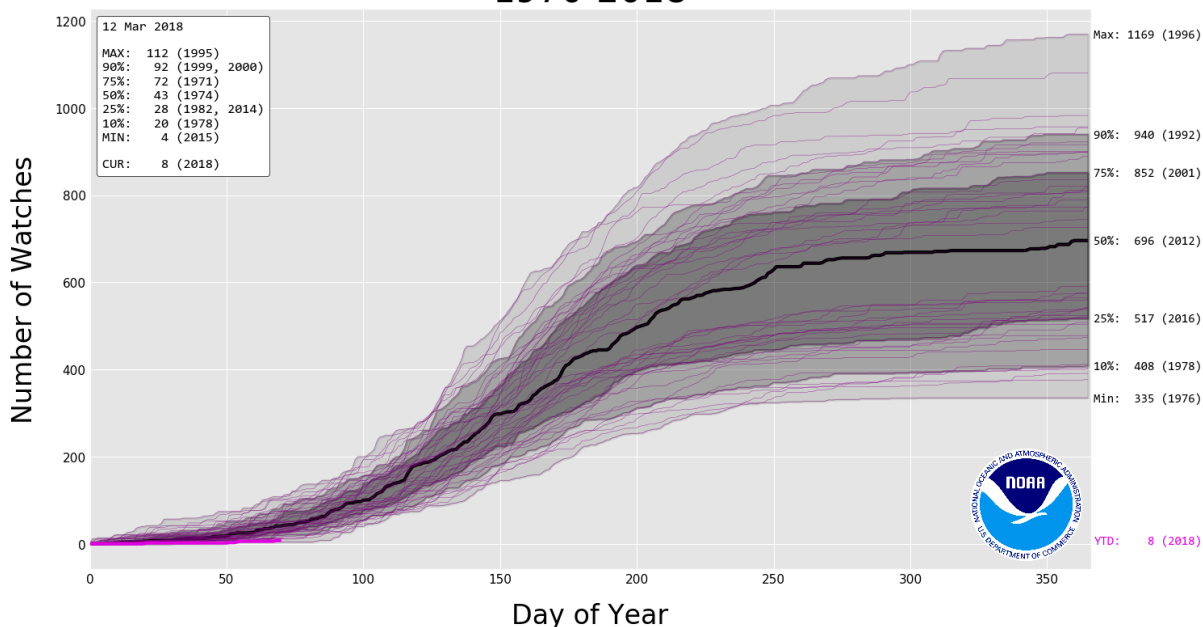
Member	ICs/LBCs	Microphysics	PBL	Grid spacing	Vert. levels	Time step
HRW NSSL	NAM/NAM -6h	WSM6	MYJ	3.2 km	40	19.1 s
HRW NSSL -12h	NAM/NAM -6h	WSM6	MYJ	3.2 km	40	19.1 s
HRW ARW	RAP/GFS -6h	WSM6	YSU	3.2 km	50	18.9 s
HRW ARW -12h	RAP/GFS -6h	WSM6	YSU	3.2 km	50	18.9 s
HRW NMMB	RAP/GFS -6h	Ferrier-Aligo	MYJ	3.2 km	50	6.6 s
HRW NMMB -12h	RAP/GFS -6h	Ferrier-Aligo	MYJ	3.2 km	50	6.6 s
NAM CONUS Nest	NAM/NAM	Ferrier-Aligo	MYJ	3 km	60	6.25 s
NAM CONUS Nest -12h	NAM/NAM	Ferrier-Aligo	MYJ	3 km	60	6.25 s

The HREF has a total of 8 members, which are indicated in the table below, along with parameterization schemes and other info. Modeled after the SSEO, the HREF performs similarly but is run at 3 km grid spacing rather than 4 km. Calibrated severe probabilities are created for tornadoes, severe hail and wind hazards in 4-hr and 24-hr bins for each hazard. For more information on the calibrated probabilistic guidance from the HREF, visit http://www.spc.noaa.gov/exper/href/documentation/HREF_SPC_Guidance_FAQ.pdf.

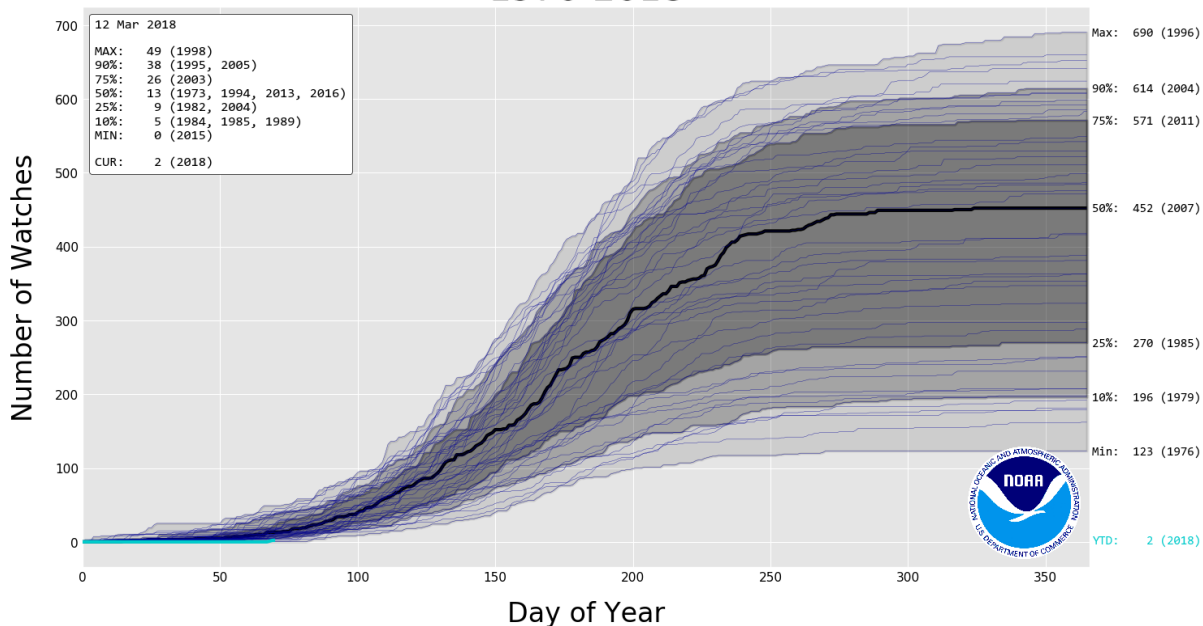
Severe Convection Unusually Quiet to Start 2018

Typically by mid-March, SPC will have issued about 43 watches (severe and tornado combined). So far in 2018, as of this writing on March 12, only 8 watches have been issued. Six of those watches have been tornado watches, with two severe thunderstorm watches.

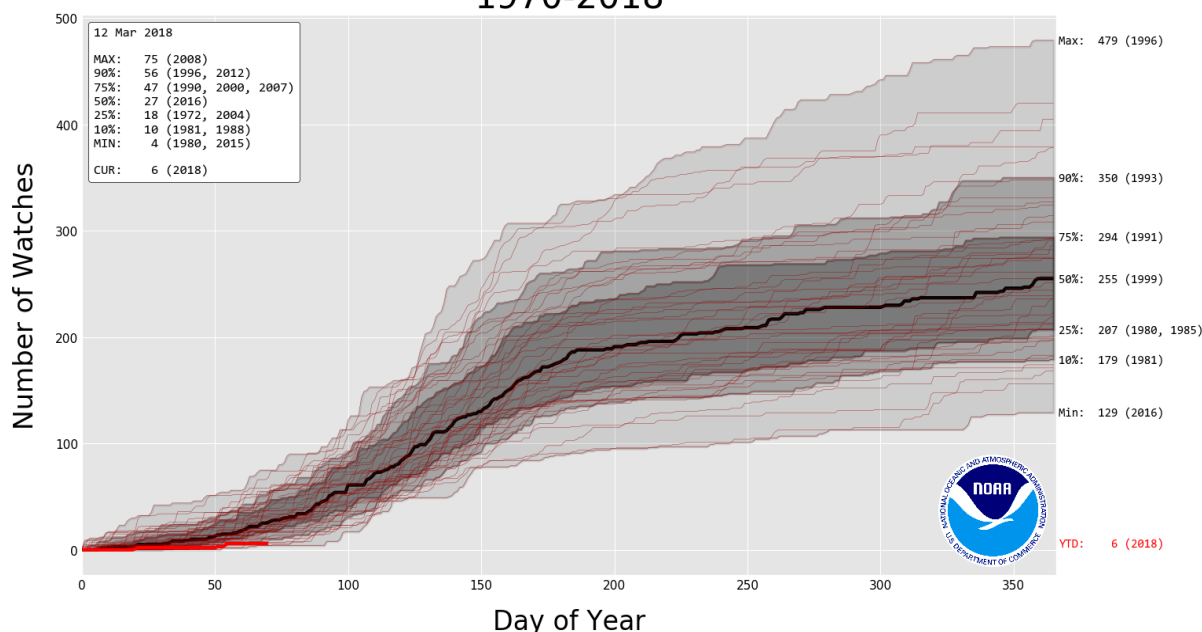
Cumulative SPC Watch Counts 1970-2018



Cumulative SPC Severe Watch Counts 1970-2018



Cumulative SPC Tornado Watch Counts 1970-2018



Since 1980, the only year that has had a slower start was 2015, when only 4 cumulative watches had been issued by March 12.

It is hard to say how this will translate to severe weather across the nation through the spring and summer. However, from a climatological perspective, there could be some clues. Currently, a weak La Niña event is ongoing across the equatorial Pacific. The Climate Prediction Center is forecasting the ENSO phase become neutral during the spring and persist into summertime. Recent research indicates that tornado and severe weather in general may be increased across the southern and parts of the southeastern United States during a La Niña. However, the current La Niña event is weak, which increases uncertainty. Furthermore, with the ENSO phase expected to become neutral, any correlation becomes tenuous. Stay tuned to see how this spring evolves!

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